

## Climate Modeling

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## **Abstract**

Climate models simulate the atmosphere, given atmospheric composition and energy from the sun, and include explicit modeling of, and exchanges with, the underlying oceans, sea ice, and land. The models are based on physical principles governing momentum, thermodynamics, cloud microphysics, radiative transfer, and turbulence. Climate models are evolving into earth-system models which will also include chemical and biological processes and afford the prospect of links to studies of human dimensions of climate and climate change.

Although the fundamental principles on which climate models are based are quite robust, computational limits preclude their numerical solution on scales which include many processes important for the determination of climate. Despite this limitation, many aspects of past and present climate and recent climate change have been successfully simulated using climate models, and climate models are used extensively to predict future climate change due to human activity.